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Service manual

Personal weighing scale, Handrail scale, Wheelchair scale, Adiposity scale

KERN MPS-M, MTS-M, MWS-M, MXS-M

Version 1.0
2/2010
GB











MPS,MTS,MWS,MXS-M-SH-e-1010

GB

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Table of Contents

1 Basic Information
Grundlegende Hinweise

The device must be repaired only by trained specialist staff or personnel with professional formation (such as a repair-specialist accredited by law concerning verification).

The service manual is obligatory for repair work.

After repair, original conditions of the device have to be restored.

Only original spare parts should be used.

<u>Instructions about conformity-evaluated scales</u>:

**Repair must be carried only at 100% compliance with the type approval.
A violation of this specification will result in a loss of the type approval!**

After successful repair the balance will have to be reverified before it can be used again in a statutorily regulated field.

Das Gerät darf nur von geschultem oder beruflich ausgebildetem Fachpersonal (z. B. eichrechtlich anerkannter Instandsetzer) repariert werden.

Die Serviceanleitung ist bindend für Reparaturen.

Das Gerät muss nach erfolgter Reparatur wieder in den Originalzustand zurückversetzt werden.

Es dürfen nur Originalersatzteile verwendet werden.

<u>Hinweis zu konformitätsbewerteten Waagen</u>:

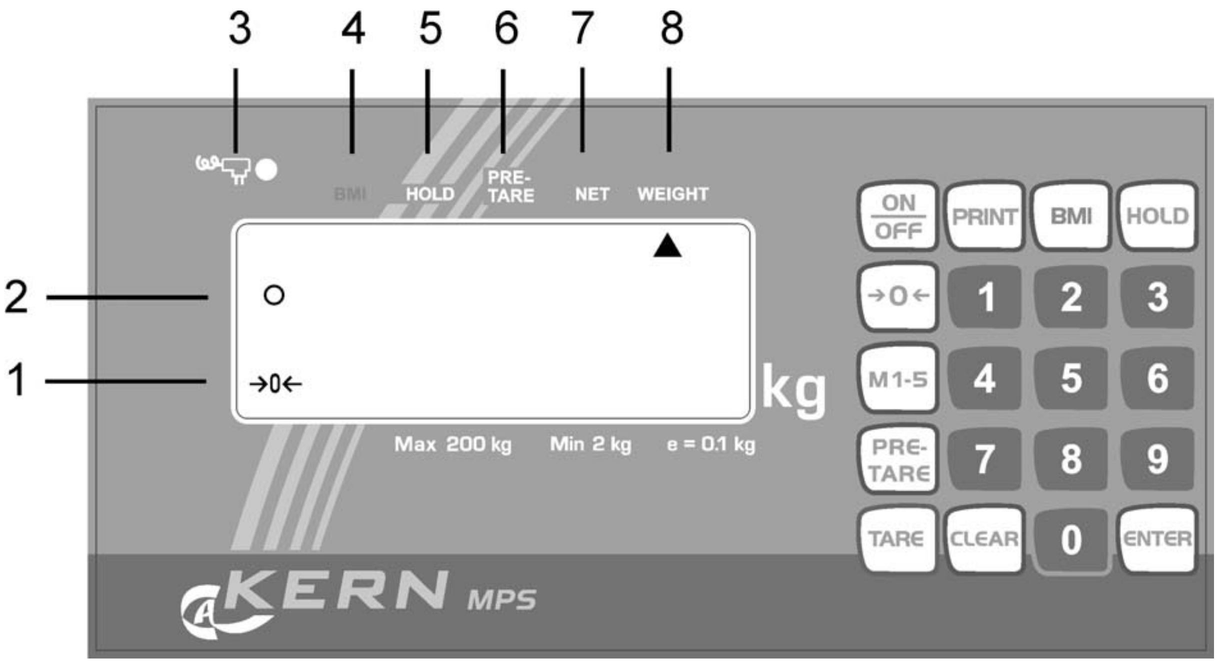
Reparatur darf nur in 100% -iger Übereinstimmung mit der Bauartzulassung erfolgen. Ein Verstoß gegen diese Vorgabe führt zum Erlöschen der Bauartzulassung!

Nach erfolgreicher Reparatur muss eine Nacheichung erfolgen, um die Waage wieder im gesetzlich geregelten Bereich verwenden zu können.

2 Technical Data

KERN	***MPS***	***MTS, MXS, MWS***
Weighing range (max.)	*200 kg*	*300 kg*
Minimal load (min.)	*2 kg*	*2 kg*
Verification value (e)	*100 g*	*100 g*
Display	*LCD with 25 mm high digits* *1.0 inch LCD display with 5 and ½ digits*	
Recommended calibra-tion weight, (class)	*200 kg* *(M1)*	*250 kg* *(M1)*
Warm-up time	*minimum 10 min*	
Operating temperature	*+5°C …. +35°C*	
Storage temperature	*-20°C … +60°C*	
Air humidity	*max. 80% (non-condensing)*	
Power supply	*mains adapter 15 V / 300 mA (EN60601-1)* *operation with 6 x 1.5 V battery supply,* *AA type batteries*	
Auto-Off function	*after 3 min without load change (possibility of setting)*	
Terminal (S x G x W) mm	*210 x 110 x 48*	
Scale ready for operation (W x D x H) mm	*275 x 295 x 60* *with column:* *275 x 460 x 1010*	*MTS: 550 x 550 x 1100* *MXS: 550 x 550 x 80* *MWS: 1155 x 800 x 80*
Scale plate mm	*275 x 295 x 60*	*MTS/MXS: 550 x 550* *MWS: 900 x 740*
Verification according to 90/384/EEC	*medical, class III*	
Medical device according to 93/42/EEC	*class I with measuring function*	

3 Overview of Display / Keyboard



Display view

No.	Display	Description
1	**[→0←]**	Scale zero display: If the scale does not show exactly zero value although the scale pan is unloaded, press the **[→0←]** key. After a short waiting time, the scale will be zeroed again.
2	**[o]**	Stabilisation display: If the display shows the stabilisation display [o], the scale is in the stable condition. When the scale is in the unstable condition, the stabilisation display [o] disappears.
3	(mains adaptor symbol)	It is illuminated when mains supply is via the mains adaptor.
4	BMI ▲	Calculated value of the body mass index (BMI).
5	HOLD ▲	Hold function / saving function is active.
6	PRE-TARE ▲	Initially set tare value is active.
7	NET ▲	The net weight is displayed.
8	WEIGHT ▲	The present weight value is displayed.

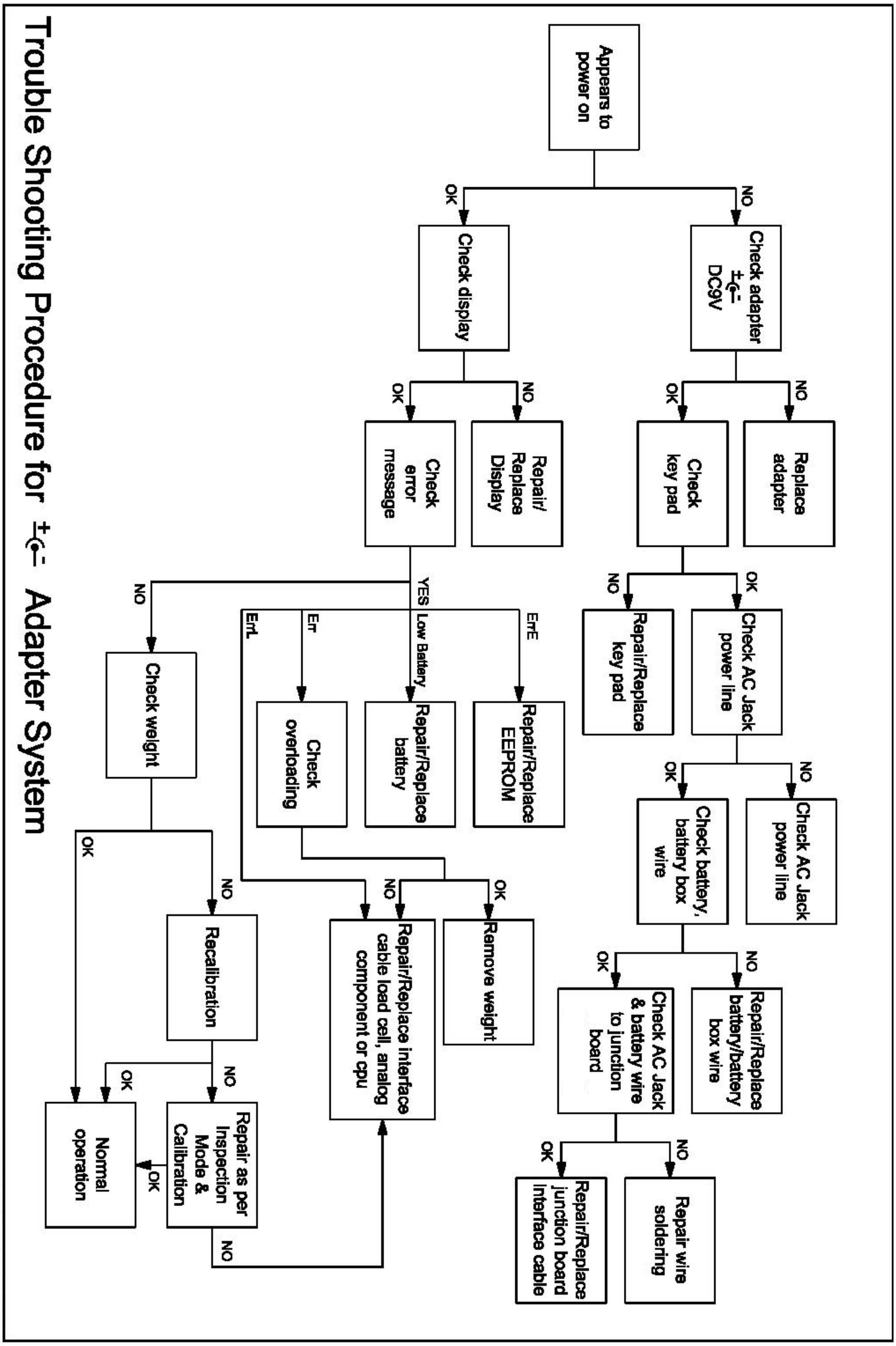
Keyboard

Key	Description
ON/OFF	Switching on/off the scale
PRINT	Data transmission via interface
BMI	Determination of Body Mass Index
HOLD	Hold function / determination of stable weighing value
→0←	The scale is reset to 0,0 kg display. It is possible to set max. up to 2% of maximal load for verified scales, and 2% or 100% of maximal load for common scales (possibility of selection in the menu)
M 1-5	Memories 1–5 were called
PRE-TARE	Calling the tare function with set values
TARE	Taring the scale
CLEAR	Clearing the digits entered manually
0..9	Entering digits
ENTER	Using the entered digits

4 Error Message Indication

A. **ErrP** : EEprom Error
B. **ErrL** : Low zero count
C. **Err** : High zero count / Overload
D. Lo : Low battery indication
E. ooooo : The scale plate was loaded during switching on the scale

5 Trouble Shooting



6 Calibration

6.1 Calibration switch and seals

After verification the display device is sealed at the indicated positions.
Verification of the balance is invalid without the "seal".

Position of the official seals:

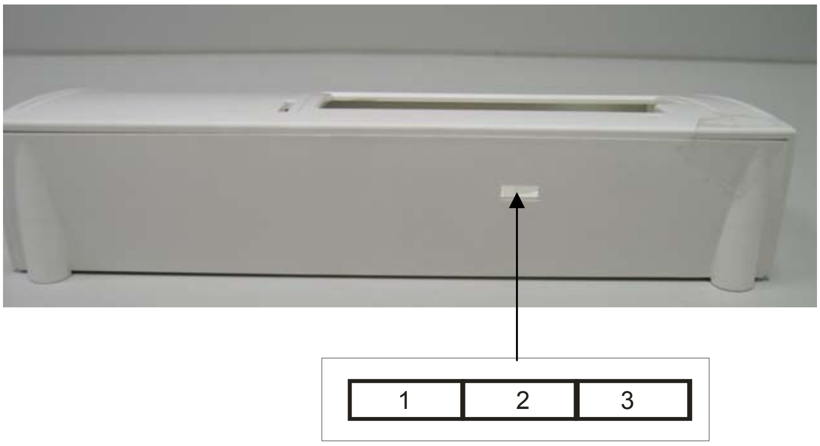
1. Backside



2. Seal mark in the battery compartment



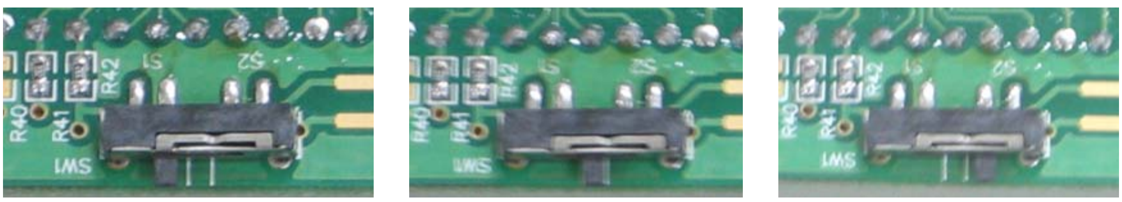
Position of calibration switch:



Position of calibration switch	Status
1. to the left	**Test mode** Shows internal count, e.g. 72377 Zero count: 5000 ~ 200000 Span count: 10000 ~ 250000 ℹ If the value of internal count is outside the reference value, please change the load cell or the main board.
2. concentric	**Service mode** Calibration position – enables calibration
3. to the right	**Approval mode** Verification position – calibration locked



Switch key



6.2 Calibration procedure

Observe stable environmental conditions. A warming up time of approx. 10 minutes is required for stabilization.

Attention:
In calibrated balances the calibration function is switch locked. To carry out calibration, set the switch to calibration position (centre position). (See chpt. 6.1).

Operation	Display
Turn on balance by pressing the **[ON/OFF]** key.	0.000
Press and keep the **[→0←]**-key pressed for about 3 seconds until the display shows "SETUP", followed by "UNIT".	SEtUP ⇩ UnIt
Press the **[TARE]**-key repeatedly until "CAL ib" appears	CAL ib
Press the **[HOLD]**-key	CAL U
Press the **[TARE]** key. The superimposed triangle ◀ must be at the left hand top corner. If not, press the **[TARE]**-key.	◀
Press the **[HOLD]**-key repeatedly until "CAL 0" appears.	CAL U ⇩ CAL 0
Press the **[TARE]**-key, a numeric value is shown on the display. After that press the **[ENTER]**-key.	30770 ⇩ CAL 0

Press the **[HOLD]**-key	
Press the **[TARE]** key. Enter the required size of the calibration weight: To select the digit to be changed, press the **[HOLD]**-key and to select the numeric value, press the **[TARE]**-key.	
Confirm by pressing the **[ENTER]**-key.	
Place the calibration weight carefully in the centre of the weighing platform; the display shows a numeric value. Press the **[ENTER]**-key. The calibration process is started.	
If the calibration was successful the weighing scales will return automatically to weighing mode and will show the weighing value of the calibration weight. Remove the calibration weight.	
Note: In the case of verified scales, switch off a scale and set the calibration switch in verification position.	

7 Service Mode

The balance must be switched over to the service mode. To achieve this, set the calibration switch to calibration position (See chpt. 6.1).

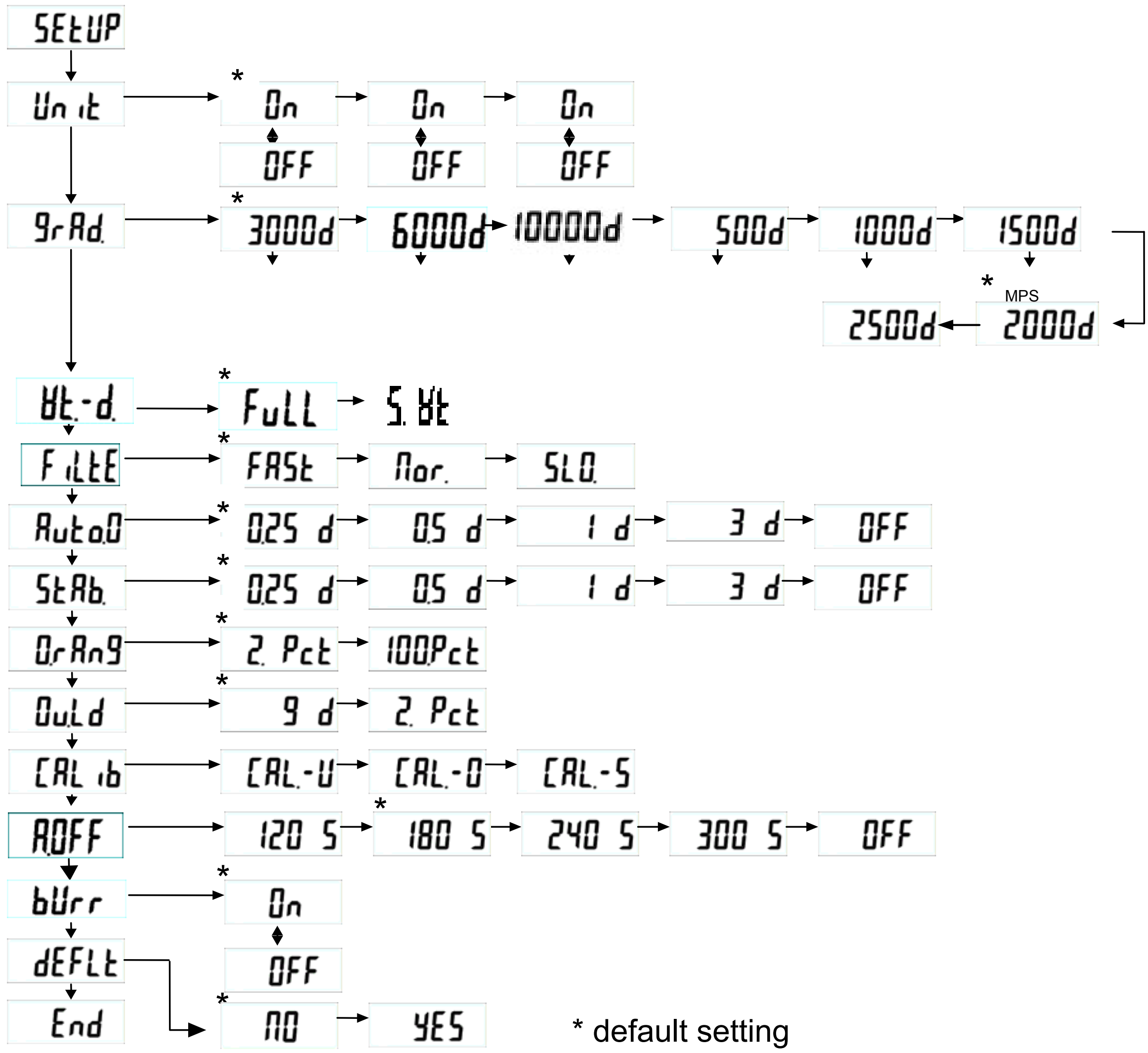
In the service mode all parameters of the balance can be modified.

7.1 Navigation in the menu

- When the scale is switched on, press and hold the **[→0←]**-key for approx. 3 seconds until “SETUP“, followed by ”UNIT“ appears.
- Press the **[TARE]**-key repeatedly until the desired function appears.
- Confirm the selected function by pressing the **[HOLD]**-key. The first parameter appears. To select the desired parameter, use the **[HOLD]**-key and confirm by pressing the **[TARE]**-key.

To exit the menu and to store, press the **[TARE]**-key repeatedly until “End“ appears, then confirm by pressing the **[HOLD]**-key. The balance returns automatically into weighing mode.

A selection is made by pressing the **[HOLD]**-key → and the **[TARE]**-key ↓



* default setting

7.2 Description

Unit	Weighing unit: Kg
GrAd.	Dividing steps (resolution) and weighing range (max)
Wt.-d.	Selection multi-range scales / single range scales
FuLL	Single-range scales
S-Wt	Multi-range scales
FiLtE	Filter: Fast / normal / slow
Auto0	Auto Zero Tracking: 0.25d / 0.5d / 1d / 3d / OFF
StAb.	Stabilisation range: 0.25d / 0.5d / 1d / 3d / OFF
0.rAnG	Zero range: 2% / 100%
0vLd	Overload range: 9d / 2%
CALib	Calibration
A.0FF	Auto off: 120 sec / 180 sec / 240 sec / 300 sec / OFF
bUrr	Audible signal: ON/OFF
dEFLt	Reset to default settings (default setup)
End	Exit menu

7.3 Setting of maximum capacity and resolution

A selection is made by pressing the **[HOLD]**-key → and the **[TARE]**-key ↓

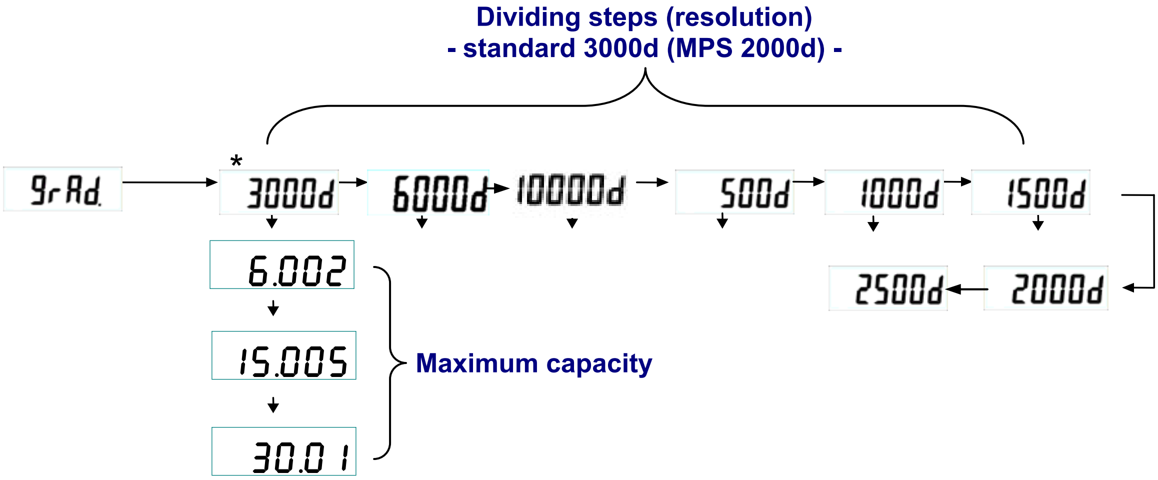


Table 1- Dividing steps

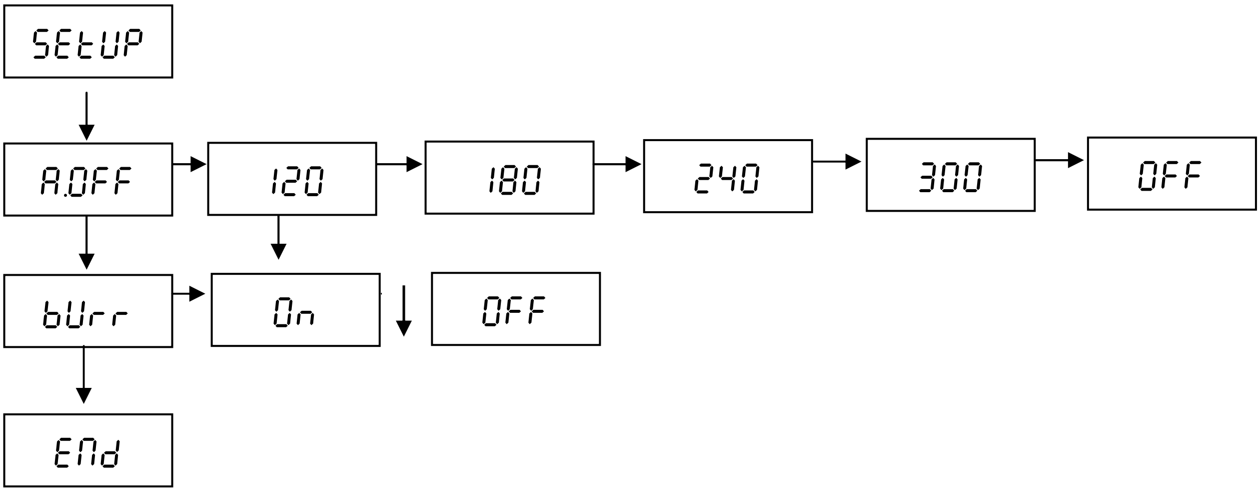
NO.	500d	1000d	1500d	2000d	2500d	3000d	6000d
1	1.002 kg	1.001 kg	1.501 kg	1.0005 kg	1.2505 kg	1.5005 kg	1.2002 kg
2	2.505 kg	2.002 kg	3.002 kg	2.001 kg	2.501 kg	3.001 kg	3.0005 kg
3	5.01 kg	5.005 kg	7.505 kg	4.002 kg	5.002 kg	6.002 kg	6.001 kg
4	10.02 kg	10.01 kg	15.01 kg	10.005 kg	12.505 kg	15.005 kg	12.002 kg
5	25.05 kg	20.02 kg	30.02 kg	20.01 kg	25.01 kg	30.01 kg	30.005 kg
6	50.1 kg	50.05 kg	75.05 kg	40.02 kg	50.02 kg	60.02 kg	60.01 kg
7	100.2 kg	100.1 kg	150.1 kg	100.05 kg	125.05 kg	150.05 kg	120.02 kg
8	250.5 kg	200.2 kg	300.2 kg	200.1 kg	250.1 kg	300.1 kg	300.05 kg
9	501 kg	500.5 kg	750.5 kg	400.2 kg	500.2 kg	600.2 kg	600.1 kg
10	1002 kg	1001 kg	1501 kg	1000.5 kg	1250.5 kg	1500.5 kg	1200.2 kg
11	2505 kg	2002 kg	3002 kg	2001 kg	2501 kg	3001 kg	3000.5 kg
12	5010 kg	5005 kg	7505 kg	4002 kg	5002 kg	6002 kg	6001 kg
13	10020 kg	10010 kg	15010 kg	10005 kg	12505 kg	15005 kg	12002 kg

8 Approval Mode – Menu Overview

Menu overview for calibrated scales (calibration switch in verification position)

When the scale is switched on, press and hold the **[→0←]**-key for about 3 seconds until “SETUP“ followed by “A.OFF“ appears.

A parameter selection is made by pressing the **[TARE]** ↓ -key and the **[HOLD]** ⟶ -key.

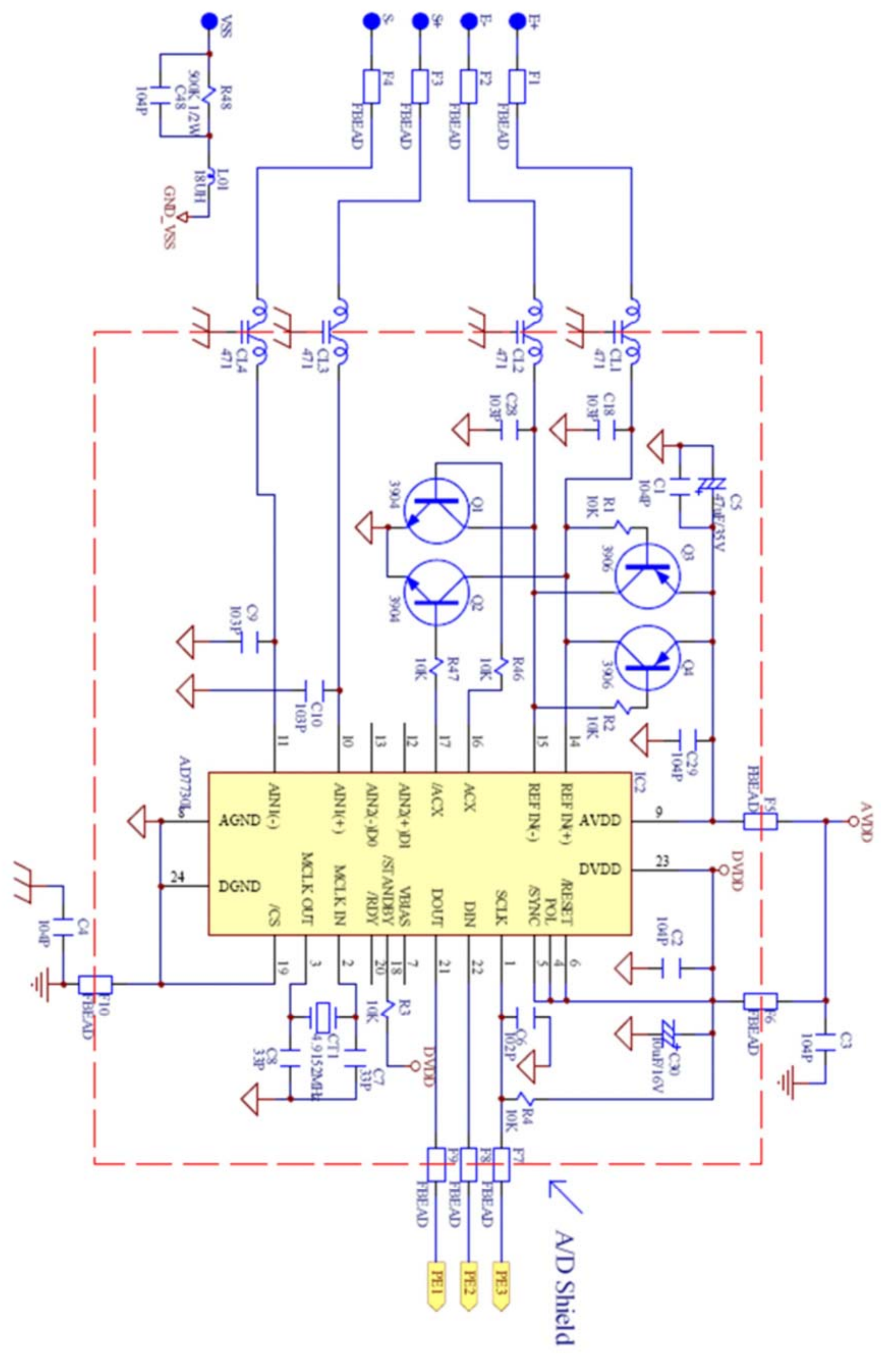


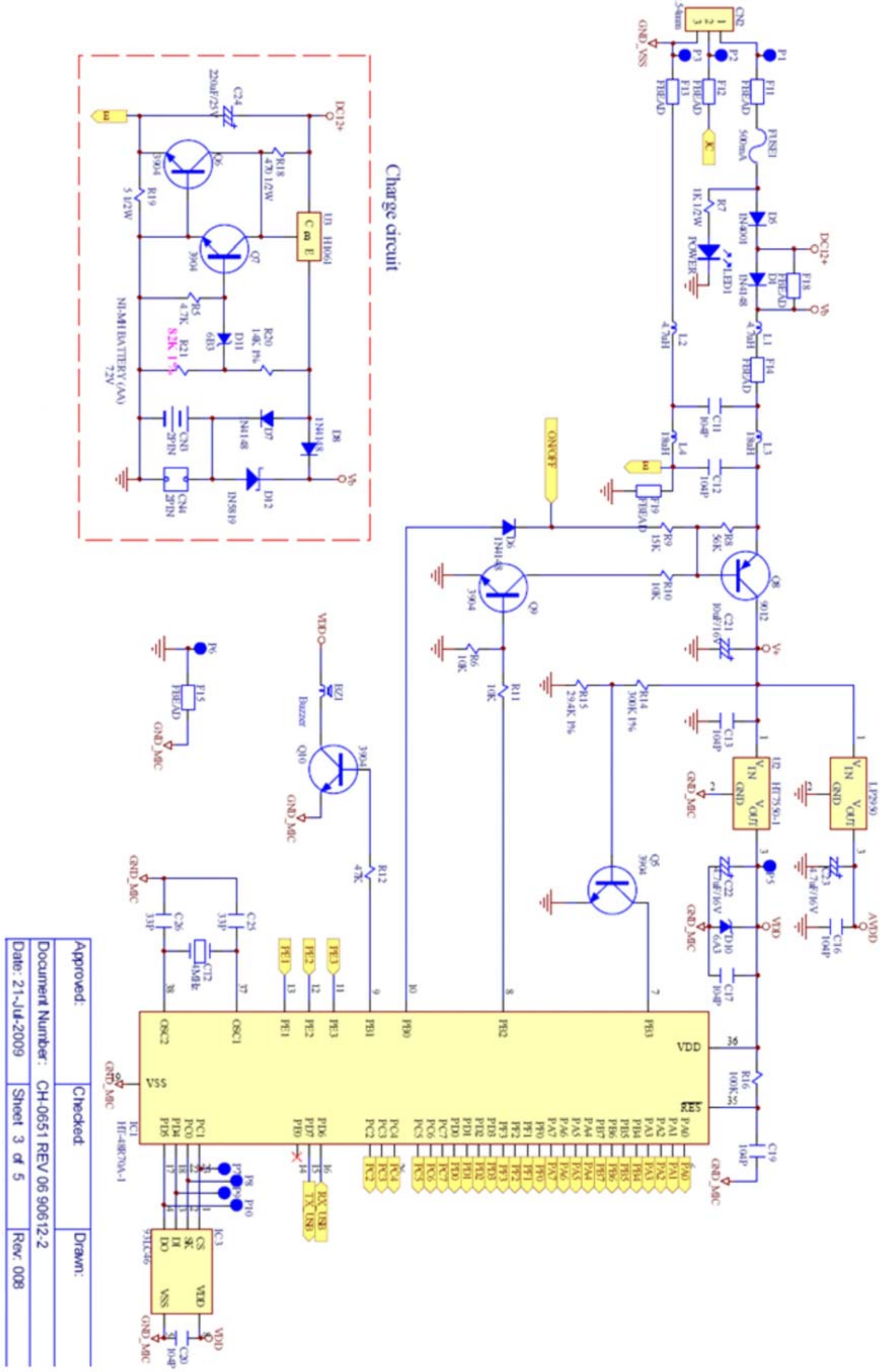
A.OFF = Auto off: 120 s / 180 s / 240 s / 300 s / OFF
bUrr = Audible signal: ON/OFF
End = Exiting the menu

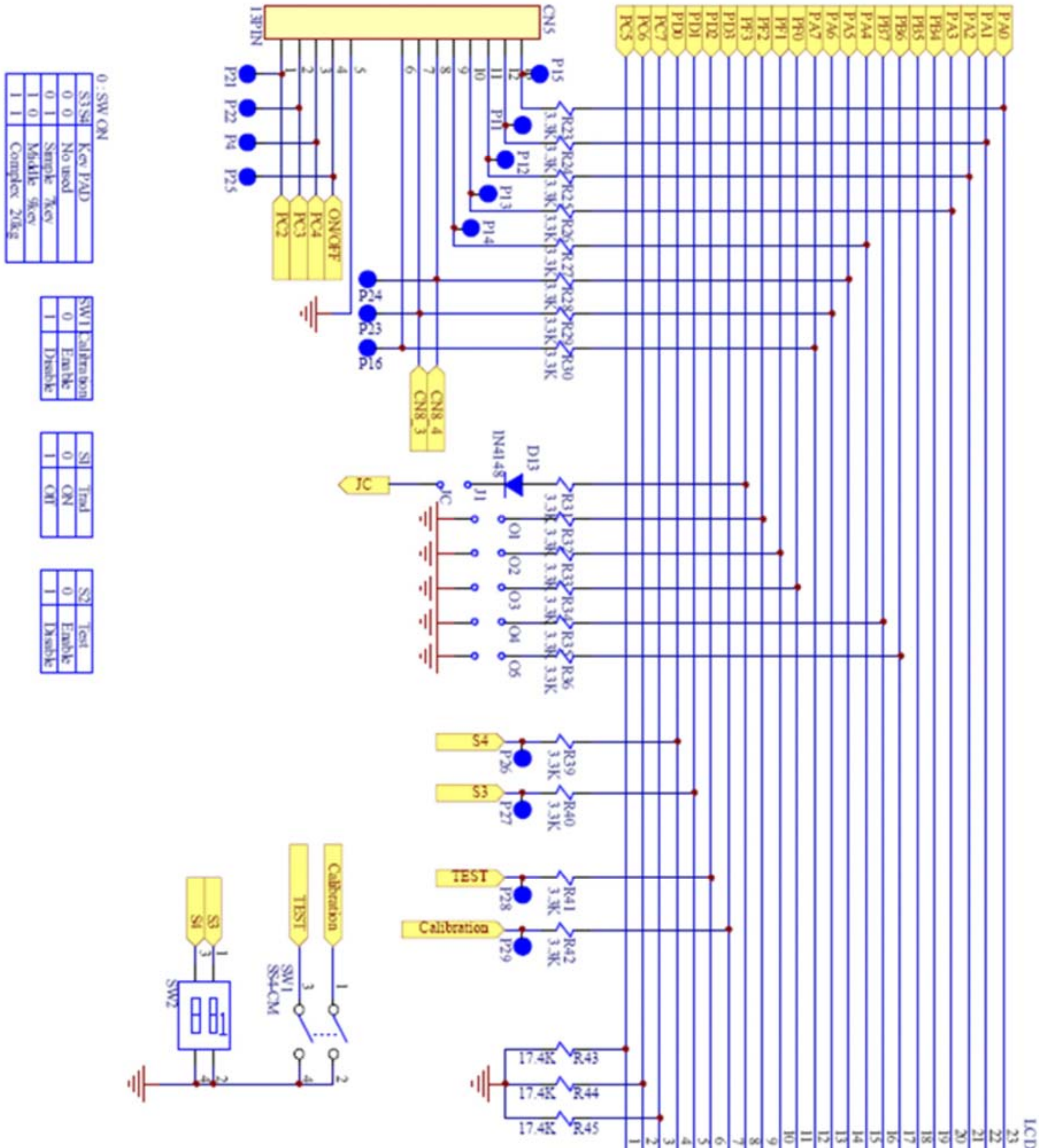
When “End” is selected, press the **[HOLD]** ⟶ -key to return to normal weighing mode.

9 Schematics

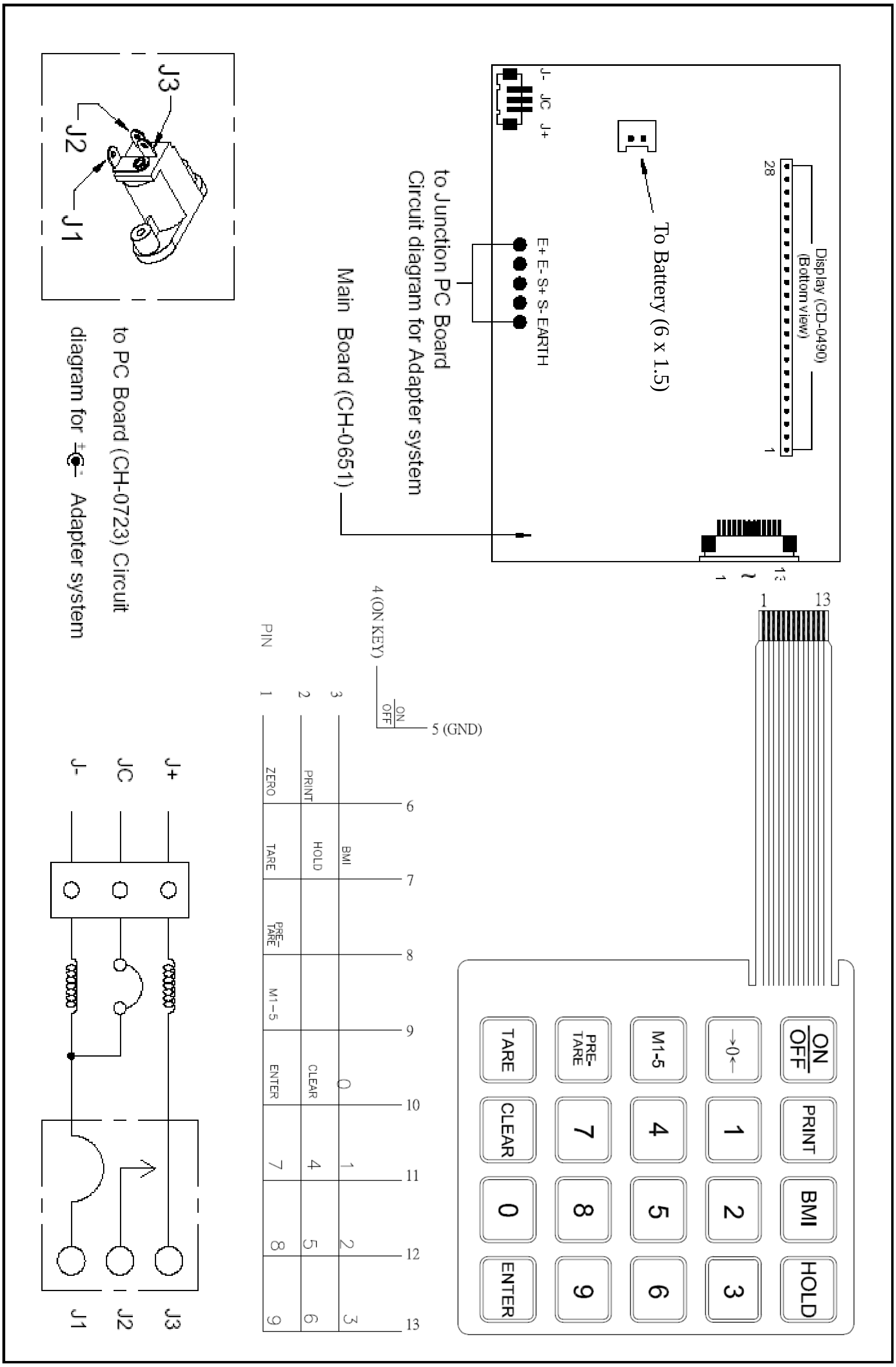
CH-0651




Charge circuit
NI-MH BATTERY (AA) 7.2V
Approved:
Checked:
Drawn:
Document Number: CH-0651 REV 06 90612-2
Date: 21-Jul-2009
Sheet 3 of 5
Rev: 008

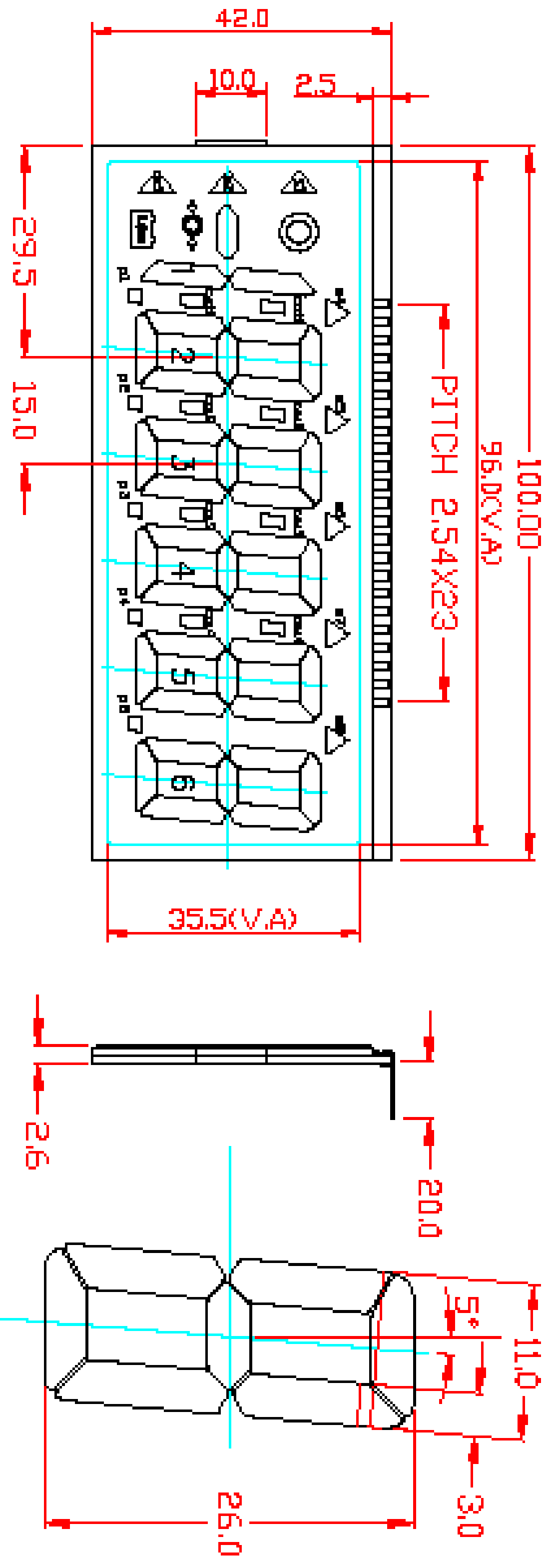

CN5
13PIN
LCD1
CD0490
D13
1N4148
JC
S4
S3
TEST
Calibration
SW1
SW2

10 System Block Diagram



11 Display Format

PIN NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
COM1	C1			s1			p1	2e	2d	p2	3e	3d	s4	s7	p3	4e	4d	p4	5e	5d	p5	6e	6d
COM2		C2		s2		1C	2f	2g	2c	3f	3g	3c	s5	s8	4f	4g	4c	5f	5g	5c	6f	6g	6c
COM3			C3	s3		1b	col1	2a	2b	col2	3a	3b	s6		col3	4a	4b	col4	5a	5b		6a	6b

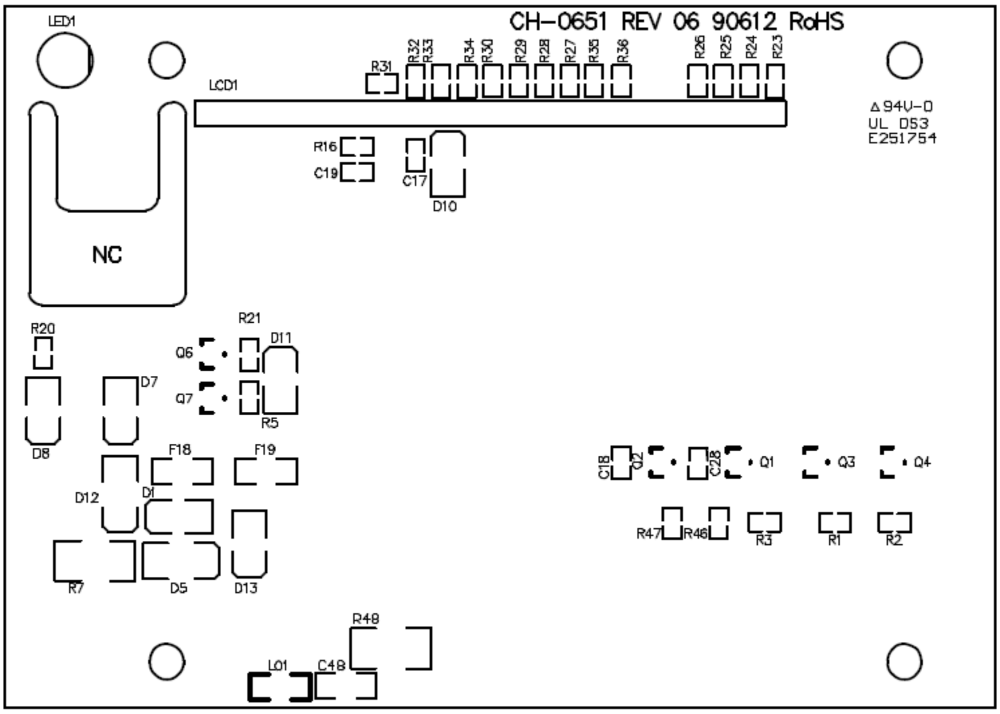


NOTE:
VOP 4.8V 1/3DUTY 1/2BIAS 64HZ
VIEWING DIRECTION 12HR
TOP:-10° TO 50° TST:-20° TO 60°

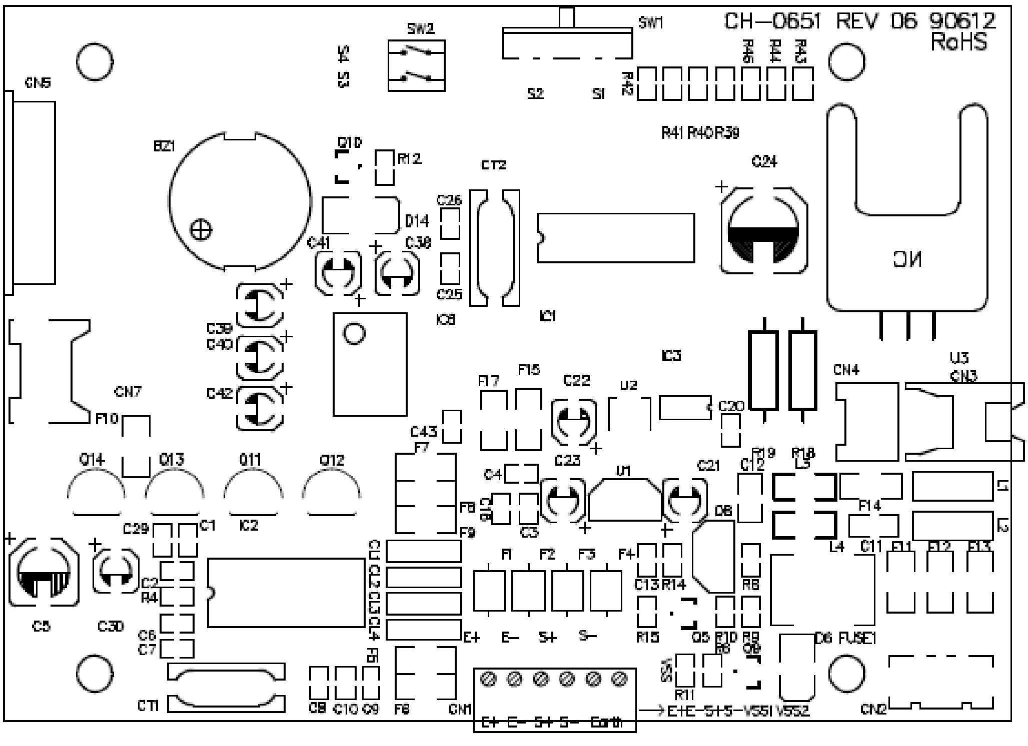
12 Layout

Primary Side of Main Board CH-0651

Top Overlay

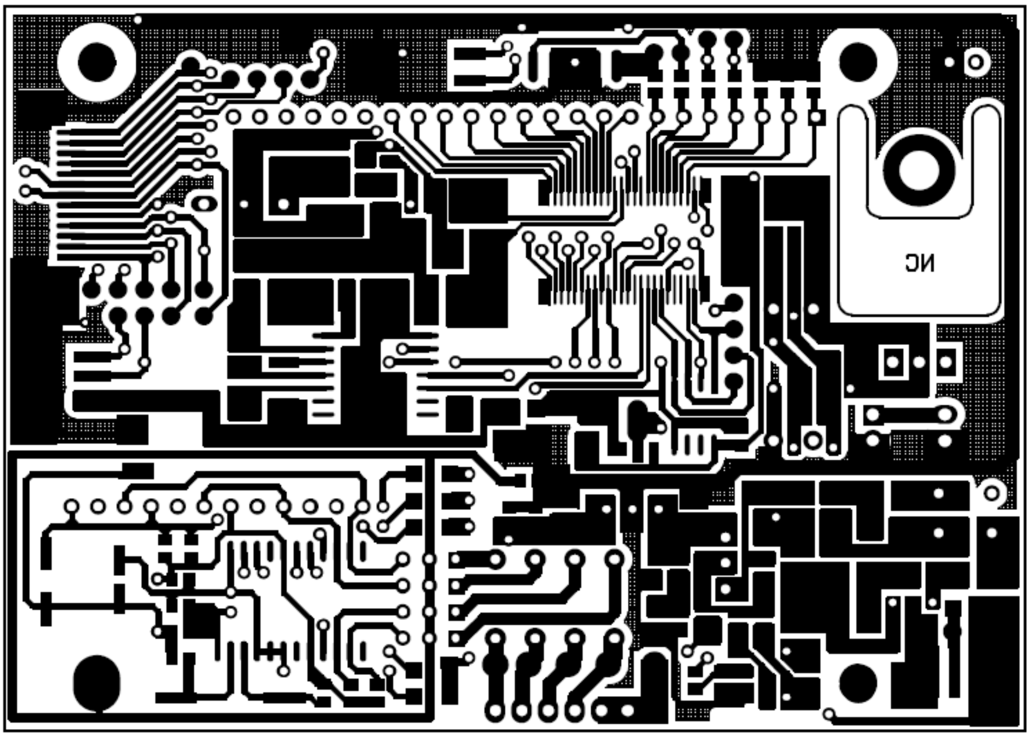


Bottom Overlay

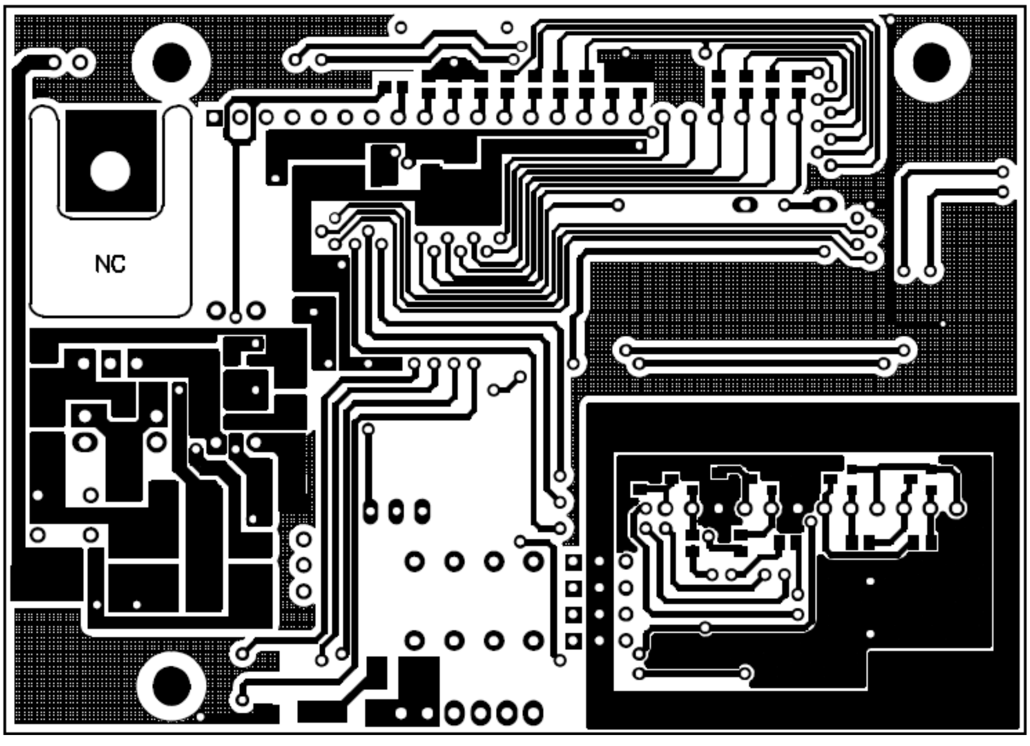


Secondary Side of Main Board CH-0651

Bottom Layer

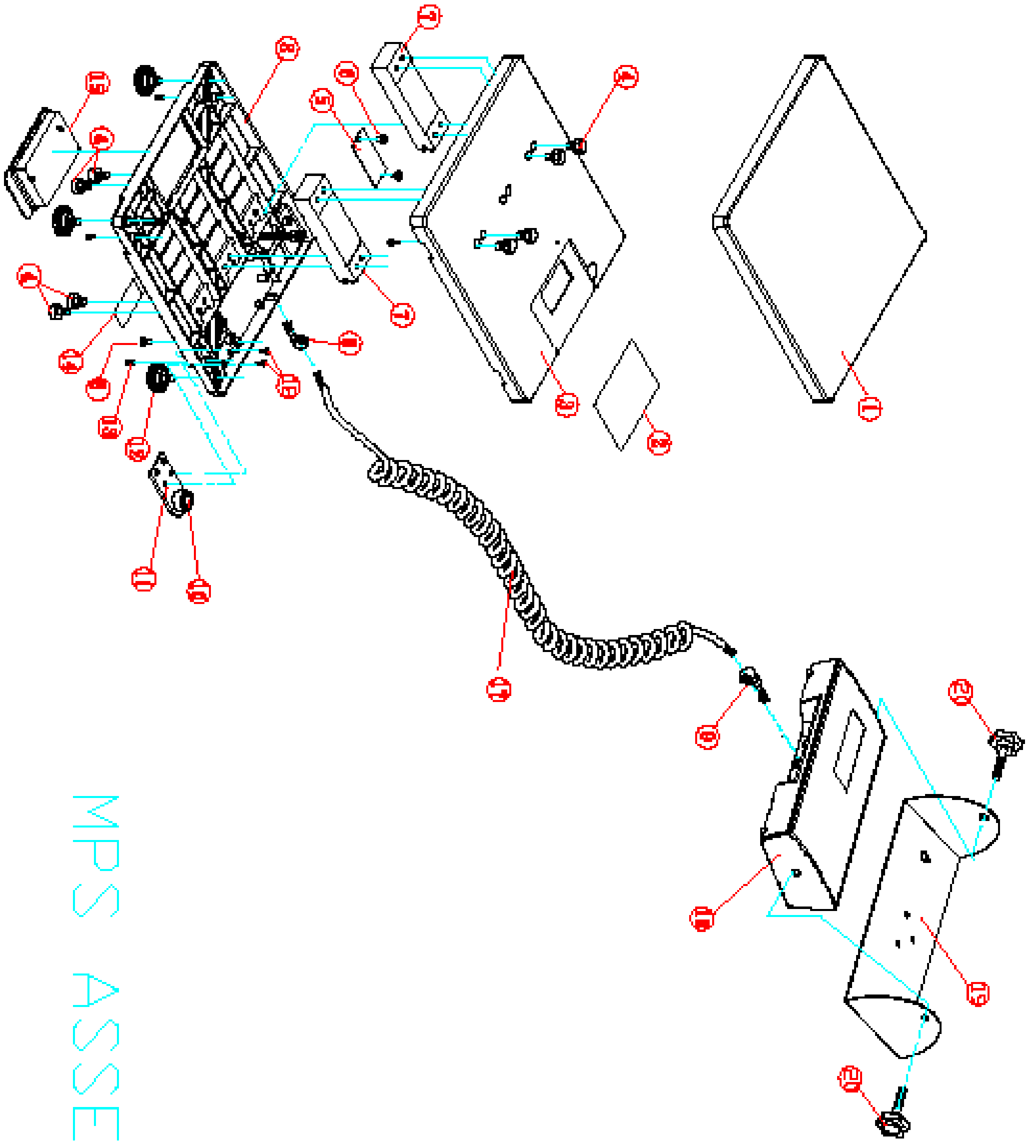


Top Layer



13 Assembly Drawing

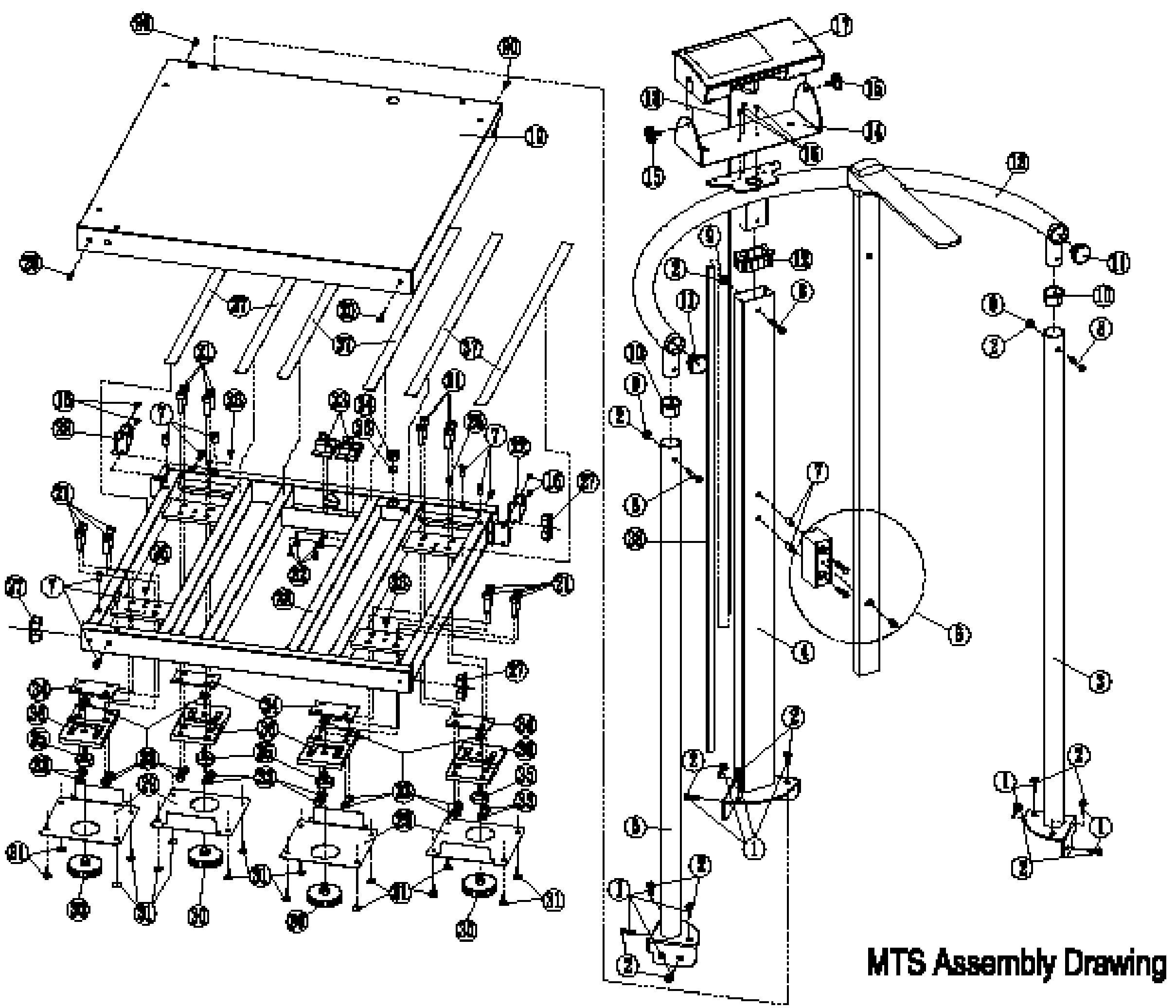
13.1 MPS 200K100M / MPS 200K100PM



MPS ASSEMBLY DRAWING

No.	Item	Spec.	Q'TY
1.	Platform	CR-8129	1
2.	Panel	NP-4231	1
3.	Aluminum Cover	CR-8130	1
4.	Hexagon Screw	M6x1.0x20	8
5.	Junction Board	CH-0710	1
6.	Screw	M4x0.7x8	3
7.	L/C	TEDEA LPS 1022	2
8.	Aluminum Base	BM-8076	1
9.	Strain Relief	SB-5M-2	2
10.	Bubble Level	ø14, DX 8mm	1
11.	Bubble Set	SS-3061	1
12.	Feet	SW-1001A	4
13.	Nylon Stopper Screw	M5 X 20	4
14.	Seal	GM-1027	1
15.	Protecting cover	ST-2591	1
16.	Indicator	DP-3300	1
17.	Cable	WR-8136	1
18.	Screw	M3x8	2
19.	Bracket	WP-8006B	1
20.	Rubber Screw	M6x13	2

13.2 MTS 300K100M

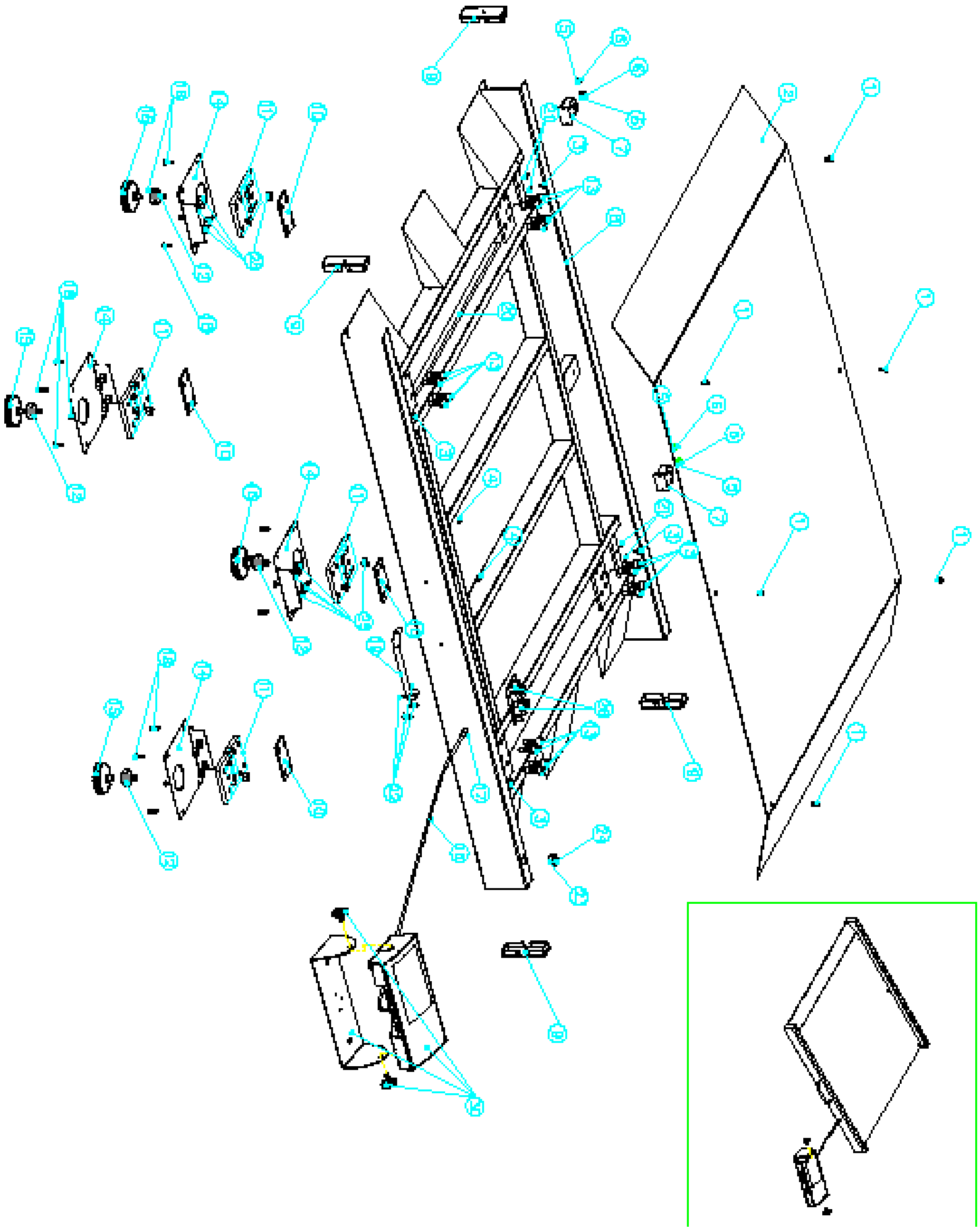


MTS Assembly Drawing

No.	Name	Spec.	Q'TY
1	Screw	M5*0.8*10	12
2	Washer	M5*12*1	16
3	Long Tube	SS-8139	1
4	Square Tube	SS-8138	1
5	Long Tube	SS-8139A	1
6	Weight Meter	Non-include	1
7	Blind Rivet	M5	11
8	Washer Head Screw	M5*0.8*30	8
9	Self-locking Nut	M5 T=5.2	8
10	Sleeve	ST-8213	2
11	Cap	ST-2301	1
12	Sleeve	ST-8214	1
13	Curve Tube	SS-8140	1
14	Bracket	WP-8006	1
15	Rubber Screw	SW-8084	2
16	Recessed Head Screw	M4*0.7*8	7
17	Indicator	SM-8112	1
18	Cable	WR-8137	1
19	Mild Steel Cover	CR-8136	1
20	Screw	M4*16	4
21	Hexagon Screw	M8*25	16
22	Wheel	SS-2040	2
23	Junction Board	[illegible]	2
24	Bubble Set	ST-097A	1
25	Bubble Level	φ14*8mm	1
26	Recessed Head Screw	M5*0.8*8	4
27	Cap	ST-0770	3
28	Frame	AM-8057	1
29	Protecting Cover	SS-416C	4
30	Feet	SW-1001A	4
31	Hook Up Knob	*MB-17	16
32	PCB Spacer	RMS-8	4
33	Nut	M8*1.25	20
34	Washer	WE-0821	4
35	Anchor Block	SB-8054	4
36	LOAD CELL	PB-150-BM	4
37	Foam	L 8*15*580mm	8
38	Button	TC-2AWB(White)	1

13.3 MWS 300K100M

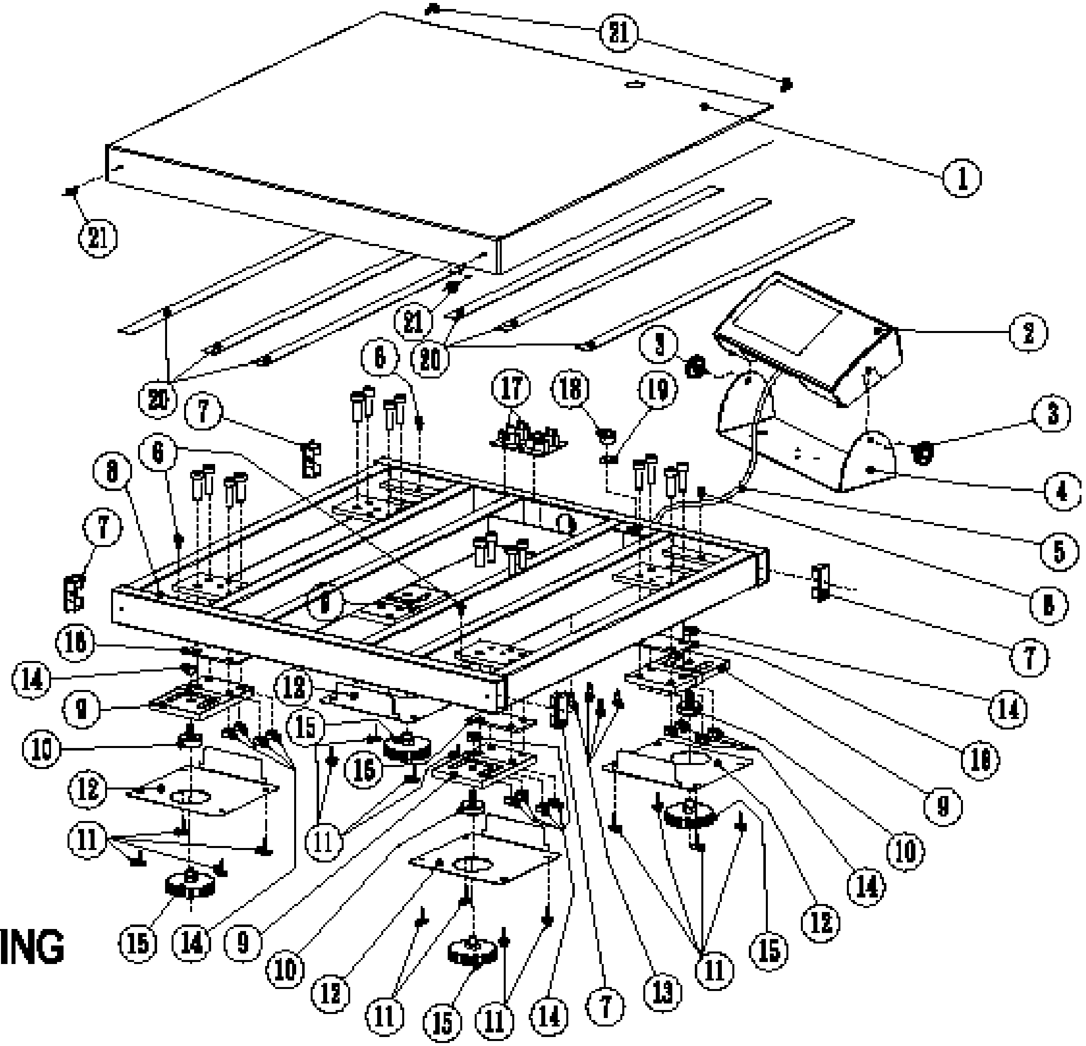
No.	Name	Spec.	Q'TY
1.	Self Tapping Screw	M4*16	8
2.	Platform	CR-2081	1
3.	Stop Screw	M6.0x0.8x8	4
4.	Hexagon Screw	M4x0.7x12	2
5.	Recessed Head Screw	M4X0.7X8	4
6.	Washer	M4	4
7.	Wheel	SS-2040	2
8.	Frame	AM-0821	1
9.	Cap	ST-8178	4
10.	Washer	WH-0821	4
11.	Loadcell	Flitec 150kg	4
12.	Anchor Block	SW-8038	4
13.	Screw	M8*1.25*25	16
14.	Protecting Cover	SS-416C	4
15.	Feet (With Nut)	SW-1001A	4
16.	3m Cable	WR-8101	1
17.	Strain Relief	*SB-SM-Z	1
18.	Hook Up Knob	NB-17	18
19.	Handle	GS-2080	1
20.	Batten	TC=485mm	3
21.	Nut	M4	4
22.	PCB Spacer	ABS-8	4
23.	Bubble Level	#14	1
24.	Bubble Bracket	ST-057A	1
25.	Nut	M8*1.25*8	20
26.	PCB Board	CH-0829	2
27.	[illegible]	M3*0.5*8	1
28.	M3 Washer		1
29.	M3 Nut		1
30.	Indicator	SM-8111	1



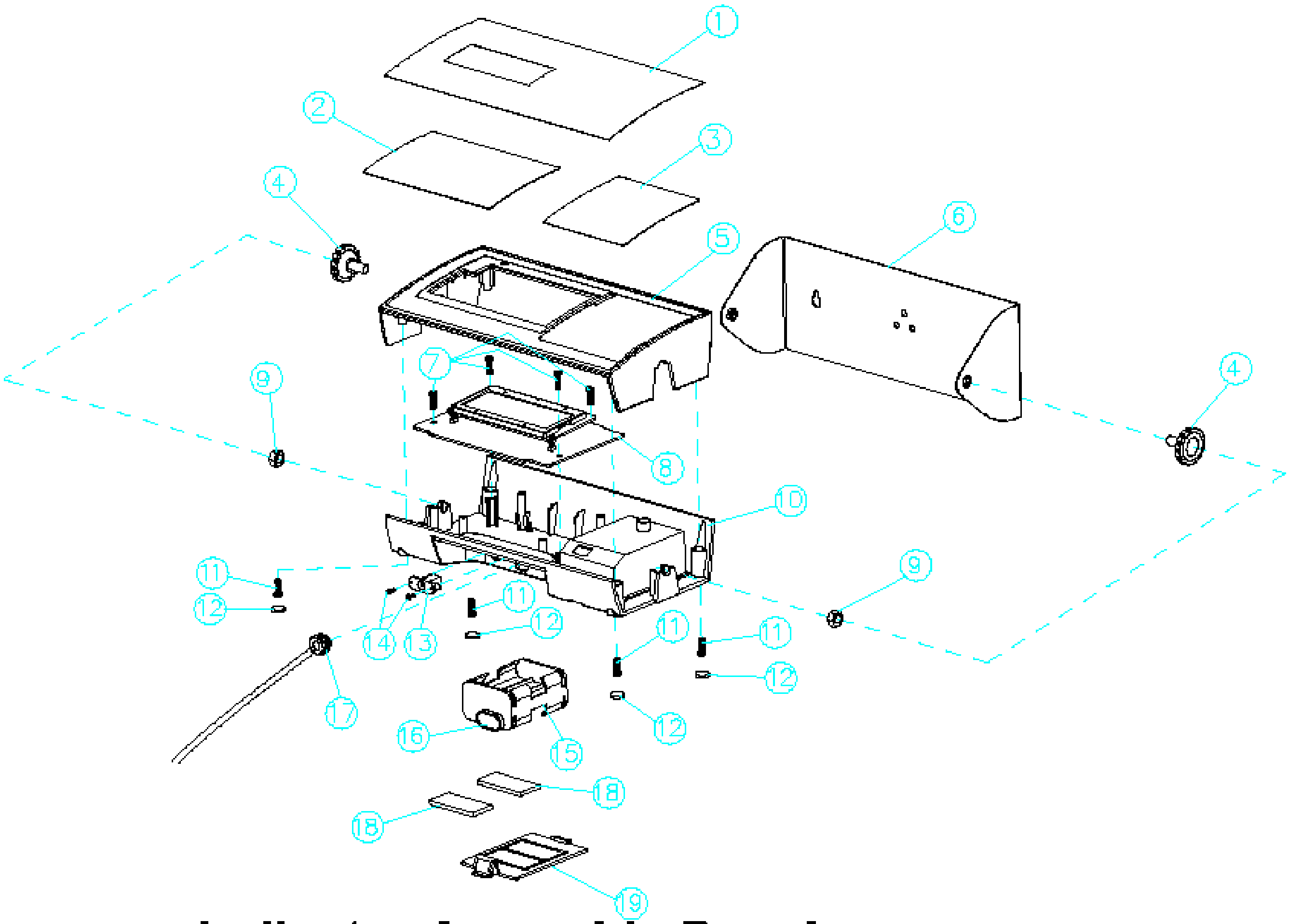
13.4 MXS 300K100M

No.	Item	Spec	Q'TY
1	Mild Steel Cover	CR-8128	1
2	Indicator	SM-8115	1
3	Rubber Screw	SW-8060	2
4	Bracket	WP-8006	1
5	Cable	WR-8130	1
6	Screw	M5*0.8*8	4
7	Cap	ST-0770	4
8	Frame	AM-8070	1
9	LOAD CELL	PB-150-RM	4
10	Washer	SS-8059	4
11	Hook Up Knob	*MB-17	16
12	Protecting Cover	SS-416C	4
13	PCB Spacer	RBS-8	4
14	Nut	M8*1.25	20
15	Feet	SW-1001A	4
16	Washer	WB-0821	4
17	Junction Board	CH-0626+CN-1201+[illegible]	2
18	Bubble set	ST-057A	1
19	Bubble Level	φ14*8mm	1
20	Foam	2*15*530mm	6
21	Screw	M4*16	8

MXS300K100M ASSEMBLY DRAWING



13.5 Indicator



Indicator Assembly Drawing

No.	Item	MWS300K100M	MTS300K100M	MXS300K100M	MPS200K100M MPS200K100PM	Q'TY
18	Foam	3*20*40mm	3*20*40mm	3*20*40mm	3*20*40mm	2
17	Strain Relief	SB-5M-2	SB-5M-2	SB-5M-2	SB-5M-2	1
16	Battery Snap	WR-2371	WR-2371	WR-2371	WR-2371	1
15	Battery Box	SN-36-1/6P	SN-36-1/6P	SN-36-1/6P	SN-36-1/6P	1
14	Screw	M2*5	M2*5	M2*5	M2*5	2
13	AC Jack	LD-0201	LD-0201	LD-0201	LD-0201	1
12	Feet	SW-0170	SW-0170	SW-0170	SW-0170	4
11	Screw	M3*8	M3*8	M3*8	M3*8	4
10	Plastic base	BM-8075	BM-8075	BM-8075	BM-8075	1
9	Nut	M6*1.0*5	M6*1.0*5	M6*1.0*5	M6*1.0*5	2
8	PCB Module	ZLC04396KG	ZLC04396KG	ZLC04395KG	ZLC04403KG	1
7	Screw	M3*8	M3*8	M3*8	M3*8	4
6	Bracket	WP-8006	WP-8006	WP-8006	WP-8006	1
5	Plastic Cover	CR-8085	CR-8085	CR-8085	CR-8085	1
4	Screw	SW-8060	SW-8060	SW-8060	SW-8060	2
3	Control Panel	NP-3371	NP-3371	NP-3371	NP-3371	1
2	LENS	LS-8045	LS-8045	LS-8045	LS-8045	1
1	Panel	NP-8337	NP-8315	NP-8338	NP-8340	1